

REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested. Claims 1-25, 29-53, and 57-81 have been canceled. Claims 26, 54-56, and 82-84 have been amended. New claims 82-135 have been added. Claims 26-28, 54-56, and 82-135 are currently pending in the application.

CLAIM REJECTIONS – 35 U.S.C. §101

In the Office Action, the Examiner rejected claims 1-84 under 35 U.S.C. §101 as being directed to non-statutory matter. Claims 1-26, 29-53, and 57-81 have been canceled. With regard to the remaining claims, this rejection is respectfully traversed.

In rejecting method claims 26-28, the Examiner contended that the method lacks a tangible result. Without any comment as to the validity of this contention, Applicants note that the test applied by the Examiner is no longer the proper test for determining whether a method constitutes statutory subject matter. According to In re Bilski, the proper test is now the machine-or-transformation test. Under this test, a method is statutory if it is tied to a particular machine or if it transforms an article from one state to another. If either one of these prongs is satisfied, then the method constitutes statutory subject matter. Under this test, the method of claims 26-28 is clearly statutory subject matter. Specifically, claim 26 has been amended to make it clear that the method is performed by an operating system executing within a computer system having different types of physical processing modules. With this amendment, it is abundantly clear that the method is tied to a particular machine (a computer system having different types of physical processing modules). Since claim 26 clearly satisfies the first prong of

the machine-or-transformation test, Applicants submit that the method of claims 26-28 is clearly statutory. Hence, Applicants respectfully request that this rejection be withdrawn.

With regard to claims 54-56, these claims have been amended to replace each instance of "computer readable medium" with "computer readable storage medium". Applicants believe that this amendment addresses the Examiner's concerns. Hence, Applicants respectfully request that this rejection be withdrawn.

With regard to claims 82-84, a computer system is claimed. This computer system comprises a first physical processing module (PPM) and a second PPM. According to paragraph 0001 of the Specification, a PPM is a chip or a die having one or more physical processing cores. Given this definition, a PPM clearly cannot be interpreted to be software per se, as contended by the Examiner. Thus, Applicants respectfully request that this rejection be withdrawn.

CLAIM REJECTIONS – 35 U.S.C. §103

In the Office Action, the Examiner rejected claims 1-84 under 35 U.S.C. §103(a) as being unpatentable over Rashid (U.S. Pub. No. 2005/0033831) in view of Brenner et al. (U.S. Patent No. 7,080,379), and further in view of Kimmel et al. (U.S. Patent No. 6,105,053). Claims 1-25, 29-53, and 57-81 have been canceled. With regard to the remaining claims, this rejection is respectfully traversed.

Claim 26

Claim 26 has been amended, and as amended, now recites:

A method performed by an operating system executing within a computer system having different types of physical processing modules, the method comprising:
receiving a first set of parametric information pertaining to a first physical processing module (PPM);

receiving a second set of parametric information pertaining to a second PPM, wherein the second PPM has a different architecture than the first PPM;
constructing a first abstraction of the first PPM based, at least partially, upon the first set of parametric information, the first abstraction comprising an indication of how many logical processing entities are provided by the first PPM, the first abstraction further comprising operational information indicating one or more operational characteristics of the first PPM; and
constructing a second abstraction of the second PPM based, at least partially, upon the second set of parametric information, the second abstraction comprising an indication of how many logical processing entities are provided by the second PPM, the second abstraction further comprising operational information indicating one or more operational characteristics of the second PPM;
wherein the second abstraction is different from the first abstraction to reflect the different architecture of the second PPM. (Emphasis added)

Claim 26 provides an advantageous method for enabling physical processing modules (PPM) having different architectures to be accommodated in the same system. According to the method of claim 26, an operating system receives a first set of parametric information pertaining to a first PPM. The operating system also receives a second set of parametric information pertaining to a second PPM, wherein the second PPM has a different architecture than the first PPM. Based at least partially upon the first set of parametric information, the operating system constructs a first abstraction of the first PPM, wherein the first abstraction comprises an indication of how many logical processing entities are provided by the first PPM, and operational information indicating one or more operational characteristics of the first PPM. The operating system also constructs, based at least partially upon the second set of parametric information, a second abstraction of the second PPM, wherein the second abstraction comprises an indication of how many logical processing entities are provided by the second PPM, and operational information indicating one or more operational characteristics of the second PPM. Because the second PPM has a different architecture than the first PPM, the second abstraction is different from the first abstraction to reflect the different architecture. By constructing these abstractions, the operating system is able to learn the specific characteristics of the PPMs, which enables the

operating system to accommodate the different PPMs in the same system. Once the abstractions are created, they can be used by the operating system to effectively carry out a variety of tasks, such as determining whether and when to assign threads to the PPMs for execution. The method of claim 26 is neither disclosed nor suggested by Rashid, Brenner, and Kimmel, taken individually or in combination.

Rashid, Brenner, and Kimmel

Rashid discloses an advanced processor comprising a plurality of multi-threaded processor cores, each having a data cache and instruction cache. It appears that the processor of Rashid is similar to the CMT PPM discussed in the Specification. Several points should be noted with regard to Rashid. First of all, it should be noted that Rashid discloses just a single processor (the processor may have multiple processing cores, but it is still a single processor). Unlike the method of claim 1, Rashid does not address a system having multiple PPMs. Rashid certainly does not disclose or suggest a system having multiple PPMs with different architectures. Another point to note is that there is nothing in Rashid that discloses or suggests constructing an abstraction for a PPM. Rashid certainly does not disclose or suggest constructing different abstractions for PPMs having different architectures. Finally, there is nothing in Rashid that discloses or suggests having an operating system construct such abstractions. Thus, as far as Applicants can see, Rashid does not disclose or suggest having an operating system construct different abstractions for PPMs having different architectures in the same system.

Brenner suffers from the same shortcomings. In Brenner, there is disclosed a method, system, and apparatus for integrating a system task scheduler with a workload manager. With Brenner, it is possible to place threads into run queues to implement the policies set by a system

administrator. Several points should be noted with regard to Brenner. First of all, it should be noted that Brenner says nothing about having PPMs with different architectures in the same system. Also, Brenner says nothing about constructing abstractions for PPMs. Brenner certainly does not disclose or suggest constructing different abstractions for PPMs having different architectures. Finally, there is nothing in Brenner that discloses or suggests having an operating system construct such abstractions. Thus, as with Rashid, Brenner does not disclose or suggest having an operating system construct different abstractions for PPMs having different architectures in the same system.

The same is true for Kimmel. In Kimmel, there is disclosed an operating system that utilizes a software abstraction of a NUMA (non-uniform memory access) multiprocessor system. With this abstraction, the operating system is able to maintain balanced processor and memory loads. Several points should be noted with regard to Kimmel. First of all, it should be noted that Kimmel says nothing about having PPMs with different architectures in the same system. While Kimmel does disclose a system having multiple processors, there is nothing in Kimmel that discloses or suggests that the processors in the system have different architectures. Another point to note is that Kimmel says nothing about constructing abstractions for the individual processors in the system. In Kimmel, the abstraction that is used by the operating system is an abstraction of the overall system. The abstraction is not an abstraction of any of the individual processors in the system. There is nothing in Kimmel that discloses or suggests constructing an abstraction for an individual processor, and there certainly is nothing that discloses or suggests constructing different abstractions for PPMs having different architectures. Finally, there is nothing in Kimmel that discloses or suggests having an operating system construct such abstractions. Thus, as was the case with Rashid and Brenner, Kimmel does not disclose or suggest having an

operating system construct different abstractions for PPMs having different architectures in the same system.

As shown by the above arguments, all of the applied references (Rashid, Brenner, and Kimmel) fail to disclose or suggest at least several of the same limitations of claim 26. Thus, even if the references were combined (assuming for the sake of argument that it would have been obvious to combine the references), the combination still would not yield the invention as claimed in claim 26. Thus, Applicants respectfully submit that claim 26 is patentable over Rashid, Brenner, and Kimmel, taken individually or in combination.

Applicants further submit that claims 27-28, which depend from claim 26, and which recite further advantageous aspects of the invention, are likewise patentable over Rashid, Brenner, and Kimmel for at least the reasons given above in connection with claim 26.

Claims 54 and 82

Claim 54 is a computer readable storage medium counterpart of method claim 26, and claim 82 is a computer system counterpart of method claim 26. Applicants respectfully submit that claims 54 and 82 are patentable over Rashid, Brenner, and Kimmel for at least the reasons given above in connection with claim 26.

Applicants further submit that claims 55-56 and 83-84, which depend from claims 54 and 82, respectively, and which recite further advantageous aspects of the invention, are likewise patentable over Rashid, Brenner, and Kimmel for at least the reasons given above in connection with claims 54 and 82.

NEW CLAIMS

New claims 85-135 have been added to claim the invention with the breadth and scope to which Applicants believe they are entitled. Applicants respectfully submit that these new claims are patentable over the cited art.

CONCLUSION

For the foregoing reasons, Applicant submits that all of the pending claims are patentable over the art of record, including any art cited but not applied. Accordingly, allowance of all of the pending claims is hereby respectfully solicited.

The Examiner is invited to telephone the undersigned at (408) 414-1080 to discuss any issue that may advance prosecution.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. § 1.136. The Commissioner is authorized to charge any fee that may be due in connection with this Reply to our Deposit Account No. 50-1302.

Respectfully submitted,

Hickman Palermo Truong & Becker LLP

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/BobbyKTruong#37499/

Bobby K. Truong
Reg. No. 37,499

2055 Gateway Place, Suite 550
San Jose, California 95110-1089
Telephone No.: (408) 414-1080 ext. 234
Facsimile No.: (408) 414-1076